

BOTANICAL MUSEUM LEAFLETS

HARVARD UNIVERSITY

BRIDGE, MASSACHUSETTS, JUNE 27, 1939

Vol. 7, No. 7

THE NOMENCLATURE OF THE TARO AND ITS VARIETIES

BY

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THE TARO, one of the oldest of cultivated plants, like other species of great antiquity has become widespread and exceedingly variable during its long history. Numerous varieties and hundreds of horticultural races have been developed under cultivation and these have received little or no systematic attention. This is particularly true in the Pacific Islands where taro constitutes one of the staple foods of the native peoples and each island or group of islands has developed its own independent races. Moreover, a difference of opinion exists among systematic botanists as to the number of species involved in this large assemblage of plants known variously as taros, dasheens, eddoes, coco-yams, malangas, tanyahs, culcas, elephant ears, Chinese potatoes and many other vernacular names. Although much remains to be done before the true relationships can be cleared up, certain general facts are available.

In the *Species Plantarum* (1753) Linnaeus described two types of taro to which he gave the names *Arum* and *Colocasia* and *Arum esculentum*. In 1832 Schott (in Schott and Endlicher *Meletemata Botanica*) established the genus *Colocasia* and transferred to it the two Linnaean species as *Colocasia antiquorum* and *C. esculenta* respec-

tively. Schott also included in his new genus *C. acris* based on *Calladium acre* which Robert Brown had described in 1810.

Kunth in his *Enumeratio Pl.* (1841) cites these three species under *Colocasia* and adds a fourth, *C. nymphaeifolia* based on *Caladium nymphaeaeifolium* Ventenat, described in 1800.

In 1854, Schott published *Colocasia Fontanesii*, which had originally been described by Desfontaines in 1829 as *Arum colocasioides*. Also in 1754, C. Koch and Sello described a sixth species, *Colocasia euchlora*.

In 1856, Schott published his *Synopsis Aroidearum* which reflected a change in the author's concept of the taro problem. Apparently he had come to feel that only a single polymorphic species was involved for he cites but one species, *Colocasia antiquorum*, and reduces the others to varietal rank. The same situation applies in Schott's *Prodromus* (1860).

In 1879, Engler's monograph of the aroids (in De Candolle *Monographia Phanerogamia*) appeared. In this work the author likewise considers the taro as a single polymorphic species, *Colocasia antiquorum*. However, in addition to Schott's five varieties, Engler recognized a variety *typica* and a variety *illustris* (based on *Alocasia illustris* Bull) which had been published in 1873.

In 1920, Engler and Krause monographed the group for the *Pflanzenreich* and continued to maintain *Colocasia antiquorum* for the taro aggregate. In addition to the seven varieties of Engler's earlier work (*typica*, *euchlora*, *Fontanesii*, *illustris*, *esculenta*, *nymphaeifolia* and *acris*) the authors included the variety *aquatilis* which Hasskarl had described in 1848, and published a new variety *globulifera*, based on the dasheen of the West Indies and of the southern United States.

In general, botanical literature from 1860 to 1900

followed the lead of Schott and Engler and we find *Colocasia antiquorum* used more or less indiscriminately for the taro and its several varieties. There has been, however, an increasing tendency, particularly in America, to recognize at least *Colocasia esculenta* as a distinct species. It is not the purpose of this paper to discuss the relative merits of these viewpoints, but rather to point out certain nomenclatorial changes which must be adopted by those botanists who continue to consider the taro and its varieties as belonging to a single composite species.

The adoption of the International Rules of Botanical Nomenclature brought into force a rule which makes it inadmissible to reduce an older specific name to varietal rank under a species of a later date of publication. Consequently Schott's reduction of *Colocasia esculenta* (1753) to varietal rank under *Colocasia antiquorum* (1832) is illegal under the Rules and cannot be maintained. The conditions must be reversed with *C. esculenta* becoming the name for the polymorphic species, which includes a variety *antiquorum*. In recent years several systematic botanists have made this change and *Colocasia esculenta* is becoming more and more frequent in literature as the name for the taro aggregate.

This reversal of names necessitates several new combinations in so far as the varieties are concerned, only a few of which have apparently been made. It seems advisable to publish these new combinations under the polymorphic species *Colocasia esculenta*, even though most American botanists hold a different opinion in regard to the taxonomic status of several of these variants.

***Colocasia esculenta* (Linn.) Schott** in Schott & Endlicher Meletem. Bot. 1 (1832) 18—Urban Symb. Antill. 4 (1903) 135—Merrill Fl. Manila (1912) 134; Interpret. Herb. Amb. (1917) 131; Enum. Philipp. Flow.

Pl. 1 (1922) 180; Comment. Lour. Fl. Cochinch. (1935) 98—Burkill Dict. Econ. Prodr. Malay Penins. 1 (1935) 638—Dalziel & Hutchinson Fl. West Trop. Afr. 2 (1936) 361.

var. typica

Arum esculentum Linnaeus Sp. Pl. (1753) 965.

Caladium esculentum Ventenat Descr. Pl. Nouv. Jard. Cels. (1800) sub t. 30—Willdenow Sp. Pl. 4 (1805) 489.

Colocasia esculenta Schott in Schott & Endlicher Meletem. Bot. 1 (1832) 18—Kunth Enum. Pl. 3 (1841) 37.

Colocasia antiquorum Schott var. *esculenta* Schott Syn. Aroid. (1856) 42; Prodr. Syst. Aroid. (1860) 140—Engler in DC. Monogr. Phan. 2 (1879) 492—Engler & Krause in Engl. Pflanzenreich IV. 23E (Heft 71) (1920) 67.

var. nymphaeifolia (Vent.) A.F.Hill comb. nov.

Caladium nymphaeaeifolium Ventenat Descr. Pl. Nouv. Jard. Cels. (1800) sub t. 30—Willdenow Sp. Pl. 4 (1805) 488.

Arum nymphaeaeifolium Roxburgh Fl. Ind. 3 (1832) 495.

Colocasia nymphaeifolia Kunth Enum. Pl. 3 (1841) 37.

Colocasia antiquorum Schott var. *nymphaeifolia* Schott Syn. Aroid. (1856) 42; Prodr. Syst. Aroid. (1860) 140—Engler in DC. Monogr. Phan. 2 (1879) 492—Engler & Krause in Engl. Pflanzenreich IV. 23E (Heft 71) (1920) 67.

var. globulifera (Engl. & Krause) Young in U.S. Dept. Agric. Dept. Bull. 1247 (1924) 8, in adnot.

Colocasia antiquorum Schott var. *globulifera* Engler & Krause in Engl. Pflanzenreich IV. 23E (Heft 71) (1920) 68.

var. **aquatilis** Hasskarl Pl. Jav. Rar. (1848) 150.

Colocasia antiquorum Schott var. *aquatilis* Engler & Krause (as *C. antiquorum* var. *aquatilis* Hasskarl) in Engl. Pflanzenreich IV. 23E (Heft 71) (1920) 68.

var. **acris** (*R. Br.*) *A. F. Hill* comb. nov.

Calladium acre R. Brown Prodr. Fl. Nov. Holl. (1810) 336.

Colocasia acris Schott in Schott & Endlicher Meletem. Bot. 1 (1832) 18.

Colocasia antiquorum Schott var. *acris* Schott Syn. Aroid. (1856) 42; Prodr. Syst. Aroid. (1860) 140—Engler in DC. Monogr. Phan. 2 (1879) 492—Engler & Krause in Engl. Pflanzenreich IV. 23E (Heft 71) (1920) 68.

var. **antiquorum** (*Schott*) *Hubbard & Rehder* in Bot. Mus. Leaflet. Harv. Univ. 1, no. 1 (1932) 5.

Arum Colocasia Linnaeus Sp. Pl. (1753) 965.

Colocasia antiquorum Schott in Schott & Endlicher Meletem. Bot. 1 (1832) 18; Syn. Aroid. (1856) 41; Prodr. Syst. Aroid. (1860) 138—Kunth Enum. Pl. 3 (1841) 37—Engler in DC. Monogr. Phan. 2 (1879) 491—Hooker filius in Bot. Mag. 120 (1894) t. 7364—Engler & Krause in Engl. Pflanzenreich IV. 23E (Heft 71) (1920) 65.

Caladium Colocasia W. F. Wight in Contrib. U. S. Nat. Herb. 9 (1905) 208.

var. **euchlora** (*C. Koch & Sello*) *A. F. Hill* comb. nov.

Colocasia euchlora C. Koch & Sello in Ind. Sem. Hort. Bot. Berol. (1854) App. 4.

Colocasia antiquorum Schott var. *euchlora* Schott
Syn. Aroid. (1856) 42; Prodr. Syst. Aroid. (1860)
140—Engler in DC. Monogr. Phan. 2 (1879) 491—
Engler & Krause in Engl. Pflanzenreich IV. 23E
(Heft 71) (1920) 67.

var. **Fontanesii** (Schott) *A.F. Hill comb. nov.*

Arum colocasioides Desfontaines Cat. Pl. Hort. Reg.
Paris, ed. 3 (1829) 7, 385.

Caladium colocasioides Hort. Par. ex Brongniart in
Nouv. Ann. Mus. Paris 3 (1834) 156—Kunth Enum.
Pl. 3 (1841) 43.

Colocasia Fontanesii Schott in Oest. Bot. Wochenbl.
4 (1854) 409.

Colocasia antiquorum Schott var. *Fontanesii* Schott
Syn. Aroid. (1856) 42; Prodr. Syst. Aroid. (1860)
140—Engler in DC. Monogr. Phan. 2 (1879) 491—
Hooker filius in Bot. Mag. 126 (1900) t. 7732—Eng-
ler & Krause in Engl. Pflanzenreich IV. 23E (Heft
71) (1920) 67.

Caladium violaceum Hort. ex Engler in DC. Monogr.
Phan. 2 (1879) 492, *in synonym.*

Colocasia violacea Hort. ex Hooker filius in Bot. Mag.
126 (1900) t. 7732, *in synonym.*

var. **illustris** (Bull) *A.F. Hill comb. nov.*

Alocasia illustris Bull Cat. (1873) 4; in Flor. Mag.
(1874) t. 107.

Colocasia antiquorum Schott var. *illustris* Engler in
DC. Monogr. Phan. 2 (1879) 492—Engler & Krause
in Engl. Pflanzenreich IV. 23E (Heft 71) (1920) 67.

NOTES ON THE GENUS ALEURITES

BY

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THE GENUS *Aleurites* J. R. & G. Forster (Char. Gen. Pl. (1776) 111, t. 56) being of considerable and increasing economic importance, merits careful taxonomic consideration. In the search for the best kinds of *Aleurites* for cultivation even taxonomically trivial variations may be important. At present even the species are poorly defined taxonomically, though they may be sufficiently distinct biologically. Minor variations have been given almost no consideration. The reason for this unfortunate situation is not indolence of systematists, but rather the paucity of specimens in herbaria, due to the general remoteness from systematic institutions of the native habitat, and lack of funds. If the last obstacle were removed, the other difficulties would soon be remedied.

The more important papers dealing with the classification of the genus are those of Hemsley 1906 and 1914, Langeron 1902, J. Mueller 1866, Pax 1910, Pax & Hoffmann 1919 and 1931. These papers are all well-known except Langeron's. Unfortunately his dissertation has been generally overlooked, perhaps because he described no new species. However, he did describe the following varieties of *Aleurites moluccana* (L.) Willd. :

I. Var. *a Rockinghamensis* Baillon ex Langeron, p. 33 (1902). The type, in the herbarium of the Muséum d'Histoire Naturelle, Paris, was collected in Australia. This variety is said to differ from the species in the angle at which the secondary nerves depart from the primary nerves, and in the more compact inflorescence.

II. Var. *β angustifolia* (Vieillard) Langeron p. 34, fig. 8 (1902); based on *Aleurites angustifolia* Vieillard in Ann. Sci. Nat. Bot. ser. 4, 16 (1862) 60. This plant has,

at least in the specimen figured by Langeron, lanceolate leaves. It occurs in New Caledonia. The nomenclatural basis of Langeron's combination is unintentionally but nevertheless thoroughly confused due to the fact that Langeron, p. 34, cites "Var. β —*angustifolia* Vieillard (pro specie)" which would have been fairly clear even though in poor form if he had not proceeded to make the following statement on the next page: "Cette plante est très probablement celle que Vieillard a décrite sous le nom d'*A. angustifolia* dans sa note sur quelques plantes intéressantes de la Nouvelle-Calédonie et provenant de Pnebo-[sic, error for Puébo] Balade." This is not a mere pedantic quibble as to whether Langeron were describing a *new* variety or merely reducing Vieillard's species to a variety. It involves the fundamental biological question of whether the two names are based on the same type and perforce synonymous or whether they are based on different types and in consequence are perhaps biologically different. While I have accepted Langeron's variety as being based on Vieillard's species, ultimately it would be enlightening to examine the specimens at Paris in order to see exactly what Langeron had in mind.

Langeron, in his vague reference to the article in which Vieillard published *Aleurites angustifolia*, gave the title of a paper of Vieillard published in the Bulletin de la Société Linnéenne de Normandie 10 (1866)--which was four years later than the correct reference given above. Furthermore, the article of 1866 did not mention *Aleurites*. *A. angustifolia* has been overlooked by Index Kewensis and all authors except Langeron. O. Stapf (Index Londinensis 1 (1929) 119) lists Langeron's illustrations of vars. *angustifolia* and *circulata*.

III. Var. γ *circulata* Langeron, p. 35, fig. 7 (1902). The type, collected by *Balansa* in New Caledonia, is in the Herb. Mus. Paris. The leaves are essentially orbic-

ular. This, like the rest of Langeron's varieties, has been overlooked by authors.

The type species of *Aleurites* is *A. triloba* J. & G. Forster Char. Gen. Pl. (1776) 112, t. 56. This species is synonymous with *A. moluccana* (L.) Willd. Sp. Pl. ed. 4, 4 (1805) 590; based on *Jatropha moluccana* L. Sp. Pl. 2 (1753) 1006—*Aleurites integrifolia* Vieillard (in Ann. Sci. Nat. Bot. ser. 4, 16 (1862) 59) was published as a synonym of *A. triloba* Forster.

From a superficial examination of the synonymy given by Pax in Engler Pflanzenreich IV. 147 (Heft 42), 132 (1910) it would appear that *Elaeococca verrucosa* (Adr. Juss. Euphorb. Gen. Tent. (1824) 112, t. 11, fig. 35) were an earlier name for *Aleurites Fordii*. Happily *Elaeococca verrucosa* was substituted for the available name *Dryandra cordata* Thunberg. Since the name *Elaeococca verrucosa* was superfluous when published, it is not to be considered for purposes of priority. Likewise the synonymy given by Wilson (in Bull. Imp. Inst. 11 (1913) 460) makes it appear that if the seeds of *Dryandra oleifera* Lamarck (Encycl. Meth. Bot. 2 (1786) 329) were taken as typifying the species, (it is said to be a mixture of two species) it would be an earlier name for *Aleurites montana* (Lour.) Wilson (in Bull. Imp. Inst. 11 (1913) 460) based on *Vernicia montana* Loureiro Fl. Cochinch. 2 (1790) 387. However, *Dryandra oleifera* was superfluous when proposed, since it was substituted for *D. cordata* Thunberg Fl. Jap., (1784) 267. Such names are not to be considered for purposes of priority according to the provisions of the International Rules of Nomenclature, ed. 3 (1935) (Arts. 45 & 60). I have proposed (in Amer. Midl. Nat. 21 (1939) 529) that such names be forever excluded from use. It appears that the "impriorable" names of Furtado (in Chronica Botanica 5 (1939) 214-215) are in the same category.

Langeron gives a map of the geographical distribution of the genus *Aleurites*. One error, which was not his fault, is to be noted. *A. moluccana* is indicated as occurring in Lower California. The basis of this error is a specimen in the Berlin Herbarium collected by *Deppe* supposedly in California. Pax cited the same collection in Engler Pflanzenreich IV. 147 (Heft 42) (1910) 131. As noted by I. M. Johnston (in Contrib. Gray Herb. 68 (1923) 88) *A. moluccana* does not occur in either Upper or Lower California but is common in Hawaii which is the probable source of *Deppe's* specimen. A parallel case is that of *Euphorbia Deppeana* Boissier. The type, which I have examined, purports to have come from California but is a member of the Hawaiian subsection *Gymnadeniæ*. Since no further collections of this species have appeared from Lower California, it seems fairly well demonstrated that the data were erroneous on some of *Deppe's* specimens.

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PLANTAE MEXICANAE III

BY

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A SIGNIFICANT VARIETY OF LIPARIS VEXILLIFERA FROM OAXACA

A LARGE COLLECTION of an interesting orchid made in Oaxaca proves to be *Sturmia arnoglossophylla* Reichb.f.

An examination of a drawing by Blanche Ames (in Herb. Ames) of the type of *Sturmia arnoglossophylla* (in Herb. Reichenbach Orch. No. 39783) together with the original description convinces me that this species falls within the range of floral variation exhibited by *Liparis vexillifera* (La Llave & Lex.) Cogn. Furthermore, this species is comparable to the specimens collected by Schultes and Reko in Oaxaca in having two broadly elliptic leaves and similar floral structure. Reichenbach's specimen, however, differs from the Oaxacan collection in being only about half as large and in having the sepals narrower and more linear. It is probably a young plant, for the inflorescence is immature at the apex.

The reduction of Reichenbach's species to varietal rank is based on the study of Mrs. Ames' drawing of the Reichenbach sheet in Vienna and on a comparison of this drawing with the Oaxacan collection of Schultes and Reko.

***Liparis vexillifera* (La Llave & Lex.) Cogniaux**
var. *arnoglossophylla* (Reichb.f.) R.E.Schultes comb.
nov.

Sturmia arnoglossophylla Reichenbach filius in Bonplandia 4 (1856) 217.

Liparis arnoglossophylla "Rchb.f." ex Hemsley in Godman & Salvin Biol. Centr.-Am. Bot. 3 (1883) 212.

Plant similar to *Liparis vexillifera*, but bifoliate. Leaves subequal, large, broadly elliptic, acuminate, very membranaceous, 9–11 cm. long, 5–7 cm. wide. Inflorescence a loose raceme. Floral bracts 5–7 mm. long, much shorter than the ovary. Sepals similar. Dorsal sepal 10 mm. long and 2 mm. wide. Lateral sepals 12 mm. long, 2 mm. wide. Petals linear, 10 mm. long, shorter than the lateral sepals. Labellum more or less acute, 14 mm. long, 8 mm. wide.

Whereas *Liparis vexillifera* appears always to have a single more or less coriaceous leaf, the variety is strikingly different in having two large, extremely membranaceous and much broader leaves. The leaves of the variety are always of slightly different size. *Liparis vexillifera* occurs commonly, but not exclusively, in somewhat dry open habitats, while *L. vexillifera* var. *arnoglossophylla* inhabits the rich, damp floor of cool dark rain-forests at high altitudes. The difference in number, texture and size of leaves of the two plants may be correlated with the usual habitat differences.

Florally, there are minor differences shown by the variety. The inflorescence appears to be more loosely racemose, while the relative size of the sepals and petals is slightly different. The lip is acute.

In *Liparis vexillifera* var. *arnoglossophylla* the lip is more or less translucent, of a pale green color. The sepals and petals are predominantly of the same color, but become a bluish-black toward the centre of the flower. The column is bright orange.

MEXICO: "New Spain," Herb. Pavon (TYPE); terrestrial, on rich damp floor of a cool dark rain-forest, slopes of Cerro del Fraile, Huautla de Jiménez, Oaxaca, at about 7500 feet altitude, August 8, 1938, Richard Evans Schultes and Blas Pablo Reko 394 (in Herb. Ames No. 55479).

Reprinted May 1970.